

UNDERCOVER

Redefining deep-earth exploration

UNDERSTANDING THE SCIENCE

REVEALING THE DEEP EARTH THROUGH GEOPHYSICAL EXPLORATION

Using the Earth's physical properties to investigate geological structures hidden beneath the surface.

OVERVIEW

Geophysical exploration allows researchers to investigate the Earth's subsurface without directly accessing it. By measuring above ground a variety of physical phenomena that are governed by physical rock properties in the underground, such as seismic wave velocity, electrical conductivity, magnetic susceptibility and density, different methods reveal different aspects of underground geology. UNDERCOVER investigates how complementary geophysical techniques can be used together to improve the understanding of geological structures and environments that may host deeply buried critical raw materials.

Why does it matter?

- **Seeing deeper** – Geophysical methods reveal geological structures that cannot be directly observed hundreds of metres underground.
- **Different methods, different insights** – Each technique provides information about different physical properties of rocks and geological structures.
- **A more complete picture** – Combining complementary geophysical observations can improve understanding of complex subsurface environments.

UNDERCOVER INNOVATION

UNDERCOVER investigates how geophysical exploration can provide a better understanding of geological structures at regional, district and deposit scales. The research combines complementary methods rather than relying on a single source of information. It also explores the potential of magnetotellurics (MT) and passive seismics to improve the imaging of large-scale geological structures and investigate their links to smaller-scale structures relevant to mineralisation. By bringing together different geophysical perspectives and scales, UNDERCOVER aims to improve the scientific understanding of the deep subsurface and its potential for hosting critical raw materials.

OUR PARTNERS

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How does it work?

Geophysical methods are sensitive to different physical properties of rocks and geological structures. Seismic methods investigate subsurface structures using seismic waves sensitive to elastic rock properties, while electromagnetic and magnetotelluric methods provide information about electrical properties. Magnetic methods detect variations in magnetic properties, and gravity methods reveal differences in density. Each method provides a different perspective on the subsurface. Together, they allow researchers to investigate geological structures that cannot be observed directly and build a more complete understanding of the deep Earth.

Key technologies

- Seismic methods
- Electromagnetic methods
- Magnetotellurics
- Magnetic methods
- Gravity methods

BENEFITS

For exploration

- Better understanding of deep geological structures
- Complementary information by sensing different subsurface rock properties
- Improved interpretation of complex geological environments
- Stronger scientific basis for identifying potential exploration areas

For society

- Advancing scientific understanding of the deep Earth
- Improving knowledge of geological structures beneath the surface
- Supporting new approaches to investigate Europe's mineral resources

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